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ORIGINAL ARTICLE

HIV among Blood Donors in Perak, Malaysia: A Review from 2015 to 2019.

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Abstract

Blood donors who are screened positive for HIV will be called for counselling and further management in our tertiary centre in Perak, Malaysia. Nucleic acid testing (NAT) and serological test are used as screening and detection of HIV among blood donors. A cross-sectional study was undertaken from January 2015 to December 2019 by reviewing the existing blood donor database of Hospital Raja Permaisuri Bainun, Ipoh, Perak, Malaysia, that handles more than 314000 blood bags during the study period. 97 individuals were tested positive with HIV, and all of them donated whole blood and the median age was 30 years old. This group of donors comprised different ethnicities (Malay 63.9%, Chinese 15.5%, Indian 18.6% and other ethnicity 2.1%) reflecting the multiracial population of Malaysia. 99% of HIV blood donors were males and more than half of them (63.9%) were single and (57.7%) new donors. 3 donors did not turn up for post-donation counselling, half of them (55.3%) denied practising any high-risk behaviours, while 44.7% of them revealed their past involvement in one or two high-risk behaviours. The most commonly reported high-risk behaviour was practising the lifestyle of casual sex or multiple sexual partners (19.1%), followed by men having sex with men (MSM) (15.1%) and "make or received payment in exchange for sex" (11.7%). It is pivotal to maintain the equilibrium between recruiting blood donors and at the same time educating those with high-risk behaviours to defer themselves prior to donating. HIV infection among blood donors remains a threat to Blood Transfusion Services (BTS) in Malaysia.

Keywords: HIV blood donors, MSM, high-risk behaviour.

Introduction

Health institutions in Malaya started to provide blood transfusion services as early as 1951, with blood collection done once a week for direct transfusions to patients. When the service of blood transfusion was in its infancy, bottles were used for whole blood collection and transfusion, and these bottles were re-used.[1] Besides, pre-transfusion testing of the donated blood was only performed to determine its ABO grouping and to screen for syphilis. Throughout the years, blood transfusion service in Malaya (Malaysia after it became fully independent in 1957) has tremendously developed and established for the benefits of the patients specially to prevent the risk of infection of transfusion transmittable infection (TTI).

Blood screening against TTIs has been upgraded as well to ensure that all Malaysians have safe blood for transfusions. No test for Hepatitis B and HIV was done before 1974. Hepatitis B surface (HBs) antigen test was introduced in the same year and subsequently HIV test was introduced in 1986.[2] Blood Transfusion Service (BTS) holds the responsibility to provide "Adequate and Safe" blood at any time.[3]

Donated blood will be subjected to ABO blood group testing and screening for infectious agents, namely HIV, Hepatitis B, Hepatitis C, and, in 2019 nucleic acid testing (NAT) has been included as well. NAT would be able to detect the window period of HIV RNA as early as 6 to 11 days of infection, compared to 28 to 90 days of infection using the Chemiluminescent Microparticle Immuno Assay (CMIA), for HIV antigen and antibody, or by Particle Agglutination (PA) test for HIV antibody detection. [4,5,6]
About 90% of recipients transfused with HIV infected blood have been found to be positive later as compared to other routes of infection. For example, in Sub Saharan Africa, 5-10% of all HIV infections are due to unsafe blood transfusion.[7] Varying residual risks of HIV transmission during blood transfusion is reported in high-income countries; from one per 1,000,000 in Spain to one per 8,300,000 in France and 2.98 per 100,000 person-years in the United States.[8] Red cell components that were not washed before transfusion shows that the HIV infectivity decreases as storage time increases. HIV-contaminated red blood cells stored <8 days are 96% infectious, while 50% infectious for those stored > 3 weeks. Besides that, HIV transmission risk is also determined by the level of the donor's viraemia at the time of donation. One-year-post-transfusion mortality rate of recipients in United States does not increase among the cases involving transfusion of HIV-positive blood. However, in Zaire, post-transfusion mortality rate of recipients transfused with HIV-positive blood is as high as 31%.[9] Thus, this justifies the importance of screening blood as per current global standard.[9]

Methods

A retrospective study was undertaken from January 2015 to December 2019 in a tertiary public hospital that handles a database of more than 314000 blood bags during the study period. This study was commenced upon obtaining the ethical approval from Medical Research & Ethics Committee (MREC), Ministry of Health, Malaysia (NMRR -20-1427-55339 (IIR), Ref: KKM/NIHSEC/P20-1557(4).

Two electronic databases "Blood Bank Information System" (BBIS) and "Sistem Statistik Untuk Kutipan dan Saringan" (SUKUSA) were reviewed from the year 2015 to 2019. These databases were documented by medical officers who interviewed blood donors prior to each donation, capturing the information of blood donors and respective donation, as well as the result of blood screening after donation. Record review and data collection were conducted by nine medical officers with at least one year of experience in transfusion medicine. A standardized data collection sheet was used to

extract the information of donors with HIV or seroconvert HIV donor, including their sociodemographic characteristics, type of donation and donor, the status of seroconversion, risk factors of HIV declared by donors during donation and post-donation counselling, the number and cost of additional screening tests performed as well as the number of patients who contracted HIV upon receiving the donated blood. For repeat donors who were tested HIV positive after repeated donations were classified as "seroconvert HIV donors", while donors who were tested HIV positive during the first donation were classified as "HIV donor. Of these, 97 donors were HIV positive and 34 seroconvert cases were detected.

The data were analyzed using SPSS (version 26.0) and the characteristics of blood donors and those tested HIV positive were descriptively summarized as frequencies and percentages.

Results

A total of 314,355 blood bags were collected from 2015 to 2019, equivalent to an average of 62,871 donations collected in a year.

Prevalence rate of HIV antigen/antibody test positivity for year 2015-2019

The prevalence rate of HIV antigen/antibody test positivity from 2015-2019 fluctuates from 0.020% to 0.043% where the lowest was recorded in 2018 (0.020%) and the highest documented in 2016 (0.043%) (Table 1).

Characteristics of donors

From 2015 to 2019, a total of 97 blood donors were tested positive with HIV (Table 2). All of them donated whole blood and had a median age of 30 years old (IQR: 25.0, 36.5). This group of donors comprised different ethnicities (Malay 63.9%, Chinese 15.5%, Indian 18.6%, other ethnicity 2.1%), reflecting the multiracial population of Malaysia. Almost all of them were male donors (99.0%), while half of them were single (63.9%) and first-time donor (57.7%). During the study period, 34 donors were seroconvert HIV donors.

High-risk activity/ behaviour

Out of 97 donors who were tested HIV positive, three donors did not turn up for post-HIV detection counselling session. During the counselling session, half of the 94 donors (55.3%) denied having any types of high risk activity or behaviour, while 44.7% of them revealed their past involvement in one to two high risk activities or behaviour prior to blood donation (Table 3).

The types of high risk activity or behaviour revealed by donors are summarized in Table 5. The most commonly reported high risk activity or behaviour was having "lifestyle of casual sex or multiple sexual partners" (18/94, 19.1%), followed by "men who have sex with men (MSM)" (14/93, 15.1%) and "make or receive payment in exchange for sex" (11/94, 11.7%).

From 2015 to 2018, approximately of six to eight donors per year reported high risk activity or behavior.. A leap in this number was noticed in 2019, where a total of 19 donors reported their involvement in high risk activity or behaviour. The number of men who have sex with men (MSM) was fluctuating. There was only one case of MSM reported in 2015, later increased to three cases in 2016; although none was reported in 2017, the number of MSM leaped to four cases in 2018 and became the most commonly reported activity in 2019 (n=6). Similarly, donors who practised casual sex or had multiple sexual partners were initially reported high in 2015 (n=5), but constantly decreased over the year until 2018 (n=1), with a drastic increase in 2019 (n=5). Notably, donors who made or received payment in exchange for sex constantly increased from 2016 (n=1) to 2019 (n=4). More high risk activities or behaviours were reported over the years, donor being an intravenous drug user (n=1), individual diagnosed with HIV (n=1) and having

sexual partners with any of the high risk behaviours (n=2) emerged in 2019.

Post-HIV detection screening
Among 97 blood donors, a total of 34 of those who have donated blood before were seroconvert HIV donors. Three patients received HIV-contaminated-blood within the review period.

Discussion

It is known now that 38.0 million people globally are living with HIV in 2019.[10] From WHO Blood Safety and Availability report, 99.9% blood donated in upper-middle-income countries are screened following basic quality procedures, as compared to 82% in low-middle-income countries or 99.8% in high-income countries.[11] Malaysia as the upper-middle-income country has stringently followed WHO requirement, hence the prevalence of HIV among blood donors in Perak is reported low in the study period. The prevalence rate of HIV blood donor was persistent from 2015 to 2019 consistent with the controlled number of HIV new cases in Malaysia. This indicates that the government and non-government organizations (NGOs) had excellence at working hand in hand to ensure Malaysia's vision of ending AIDS by 2030 was a success (Ending AIDS 2021-2030).[12] It is reported that new HIV cases have halved from the year 2002, 6978 new cases (equivalent to 28 cases per 100000 population), to 3293 cases in 2018 (equivalent to 10.0 cases per 100000 population) while the incidence rate per 1000 uninfected population had gradually decreased to 0.25 in 2018.[12] On the contrary, in a region of central China, HIV prevalence rate among HIV blood donors was $23.5/10^5$ in 2013, a significant rise from 2.74 in 2004 suggesting an acceleration of the disease among blood donors and community. [13]

Even though the result is consistent representing multiracial among Malaysians, however to compare with new HIV infection by race in 2013, Indians showed higher HIV blood donors (18.6%) compared to only 8% of new HIV infection among Indians (in 2013), while other races showed coherent percentage of HIV blood donors and new infections of HIV.[14] In 2011, the statistics by Department of Statistic Malaysia showed that the population consisted of Bumiputera (67.4%), Chinese (24.6%), Indian (7.3%) and Others (0.7%). Therefore, Malay HIV donors were unvaried with the national statistic or new HIV infections recorded. On the other hand, Chinese HIV donors were lower than Malay or Indian HIV donors.

In Perak, Malaysia, there is a significant difference between male and female HIV blood donors where 99% HIV donors are males and 1% is female. In a local study of the rate of seroconversion in repeat blood donors at National Blood Centre, Kuala Lumpur in 2012, male donors (86.4%) outnumbered female donors (13.6%) as well.[15] Meanwhile, from a study of the prevalence of HIV among blood donors in a tertiary care center in North India from a period of 1999-2009, 97.4 per cent (493/506) were males and 2.6 per cent (13/506) were females. [16] From UNAIDS statistic, globally, women and girls accounted for about 48% of all new HIV infections in 2019.[10] However, in terms of eligibility of blood donation, males are more readily to donate blood as females tend to have haemoglobin of less than 12.5 g/dl and thus males contribute to 60-70% of total blood collection annually in Malaysia. [15]

Surprisingly, most HIV blood donors are single (63.9%) where married (35.1%) and divorced (1%) showed lesser percentage. Similar result was found in a previously mentioned local study in Kuala Lumpur where 77.3% were single. However, in a similar study in Brazil, there was no significant difference between single individuals compared to married, widowed, and other individuals. [17] Otherwise, in another study in China, the prevalence of HIV infection among

former commercial plasma donors in rural eastern China was higher in married donors. [18]

The study showed that half of HIV donors are new donors (57.7%), followed by regular donors (22.7%) and lapsed donors (19.6%). WHO suggested that 5% is the rate of regular voluntary blood donation from population in any developed country. And yet Malaysian blood donation rate ranges from 2.0-2.25%. Thus, it is important to enhance the recruitment of new donors and at the same time be dubious of the HIV status through strict blood screening and effective interviewing prior to donation as most HIV blood donors are first time donors. Similar findings were noted from the study in Mali. [19]

Concerning high-risk behaviour, in a recent study in Kelantan, Malaysia shows that 81.5% of the respondents have poor knowledge and perceptions of blood safety, less than 30% are aware that multiple sexual partners, bisexual people and male homosexuality are permanently deferred.[20] Dreadfully, 39.3% of donors assumed that they could check their HIV status through blood donation while 29.4% of donors agreed that donors are responsible if their blood causes infection. [20]

From this study, 44.7% of donors revealed their high-risk behaviour during post-HIV detection counselling. Most respondents responded that they practised safe sex and should not be infected and thought that pre-donation interview is pertaining to recent activities.[15] Meanwhile in Italy, 32.4% reported sexual risk behaviours of less than 4 months prior to donation, even though they denied at-risk behaviors in pre-donation selection; 84.1% were males and 63.7% were repeated donors. These donors claimed that they did not realize having engaged in at-risk behaviour'.[21]

In a study in Australia estimating the risk of blood donation associated with HIV risk behaviours, MSM was estimated to be at highest risk of becoming infected and donating in the window period.[22] Notably, from Malaysia Country Progress Report On HIV/AIDS 2019, HIV prevalence among MSM had significantly risen from 3.9% in 2009 to 21.6% in 2017.[12] Between 2005 and 2016, the MSM-associated fraction of HIV transfusion residual risk (%RRMSM) increase varied from 0 to 19% in France.[23] Similarly, another study also found that among the groups that are most affected by HIV are MSM and black Africans. (24) HIV cases among MSM in China are also noted as an emerging epidermic where HIV prevalence was 6.3% in 2011, up from 5.7% in 2010 and just 2% in 2007.[25,26] These factors explain the escalation of MSM as the most frequent high-risk behaviour among Perak's HIV blood donors in 2019.

Conversely, among HIV blood donors, no IVDU was reported until one case in 2019. The prevalence of HIV in Malaysia among IVDU had almost halved from 22.1% in 2009 to 13.4% in 2017. A single episode of injecting drug use is associated with very low risk of HIV transmission but remains as one of high-risk behaviours causing TTI. [22,27] Hence it justifies very low or almost none IVDU high risk behaviour reported among HIV blood donors in Perak.

Nevertheless, lifestyle of casual sex, multiple sexual partners and involvement in sex industry remain as a threat of HIV transmission[28,29,30,31] and hence affect the blood safety during blood donation. [32] HIV prevalence in Malaysia among Female Sex Worker (FSW) shrink from 10.5% in 2009 to 6.3% in 2017, whereas transgender people (TG) showed a slight increment from 9.3% to 10.9%.[12] From the study period, those high risk behaviors had been reported among HIV blood donors in Perak almost every year.

Conclusion

In general, the prevalence rate of HIV donors among blood donors in Perak, Malaysia is considered lower compared to WHO's prevalence

of transfusion-transmissible infections in blood donations (Median, Interquartile range (IQR)), by income groups (0.03%-0.23%).[10] Ethnicity distributions among HIV blood donors represent the multiracial population of Malaysian as recorded by Department of Statistic Malaysia. From this study, we noted that some donor characteristics associated with higher HIV incidence are Malay, male, single, 30-years-old and is a new donor. Half HIV donors denied any high risk behaviour despite tested positive for HIV. Other half reported high risk behavior, lifestyle of casual sex or multiple sexual partners, men who have sex with men (MSM) and individual involved with sex industries are the most popular high risk behaviors. While on the other hand, intravenous drug users remain dormant until in 2019.

Therefore, it is pivotal to maintain the equilibrium between promoting and recruiting more donors to come forward to donate voluntarily and simultaneously educate donors with high risk activities to defer themselves from donating. We recommended that the government impose early donor education from school age and dissemination of blood donor education materials via the social media. HIV infections among blood donors remain a threat to BTS in Malaysia.

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Table 1: Prevalence rate of HIV antigen/antibody test positivity for year 2015-2019

Year	Total Collection	Prevalence rate (%)
2015	60952	0.026
2016	57918	0.043
2017	58035	0.040
2018	76834	0.020
2019	60616	0.030

Table 2. Characteristics of blood donors tested HIV positive

Characteristics	**n=97**	
Age in year, Median (IQR)	30.0	(25.0, 36.5)
Duration to HIV detection after donation, in months, Median (IQR)	1.1	(0.7, 1.5)
Ethnicity, n (%)		
Malay	62	(63.9)
Chinese	15	(15.5)
Indian	18	(18.6)
Others	2	(2.1)
Sex, n (%)		
Male	96	(99.0)
Female	1	(1.0)
Marital status, n (%)		
Single	62	(63.9)
Married	34	(35.1)
Divorced	1	(1.0)
Types of donor, n (%)		
First time donor	60	(61.9)
Regular donor	21	(21.6)
Lapsed donor	16	(16.5)
Seroconverted donor, n (%)	34	(35.1)

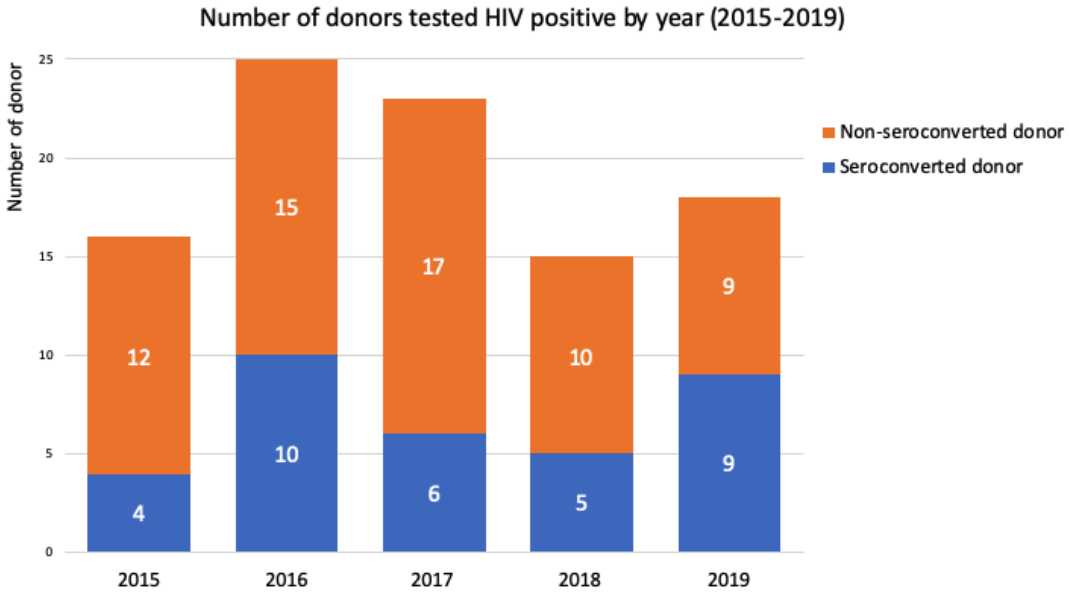

Figure 1. This figure shows the number of seroconverted and non-seroconverted donors by year. Seroconverted donors were those tested HIV positive after repeated donations.

Table 3. Prevalence of HIV Seroconvert Donor from 2015 to 2019

Year	**Number of HIV Seroconvert Donor / HIV blood donor**	**Prevalence rate (%)**
2015	4 / 16	25.0
2016	10 / 25	40.0
2017	6 / 23	26.1
2018	5 / 15	33.3
2019	9 / 18	50.0

Table 4. Number of high risk activity/behaviour revealed by donor during post-HIV detection counselling

Number high risk activity/behaviour, n (%)	**n= 94***
0	52 (55.3)
1	37 (39.4)
3	5 (5.3)

*Out of 97 donors tested HIV positive, only 94 of them turned up for post-HIV detection counselling.

Table 5. Donor declaration of high risk activity/behaviour during post-HIV detection counselling

High risk activity/behaviour, n (%)	**n=94***
Men who have sex with men (MSM), n=93**	14 (15.1)
Individual who makes or receives payment in exchange for sex (including sex workers, clients)	11 (11.7)
Intravenous drug users (IVDU)	1 (1.1)
Individual diagnosed with HIV	1 (1.1)
Lifestyle of casual sex/ Multiple sexual partners	18 (19.1)
Sexual partners of above mentioned person	2 (2.1)

*Out of 97 donors tested HIV positive, only 94 of them turned up for post-HIV detection counselling.
** Excluding one female donor, only 93 donors were applicable.

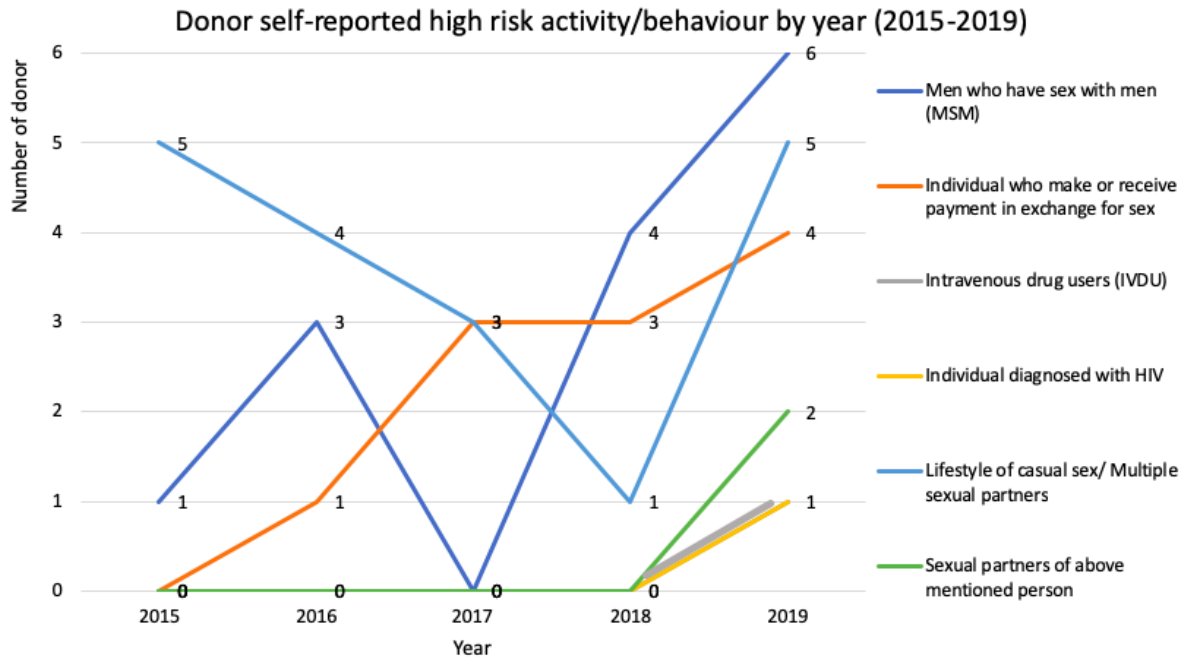

Figure 2: The figure shows the frequency of high risk activity or behaviour that was self-reported by donors during post-HIV detection counselling session.

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